

REMARKS

The Office Action dated January 7, 2009, is the second Action in the application. The Office has withdrawn the rejections of claims 1-28 under 35 U.S.C. § 103(a) as being unpatentable over Fukui et al., WO2002/21616 ("Fukui"), in view of Masatoshi et al., JP 2003-086243 ("Masatoshi"), and over Fukui in view of Masatoshi and further in view of Lee et al., U.S. Patent Application Publication No. 2004/0213985, that were made in the first Action.

The Office is now rejecting the claims under 35 U.S.C. § 103(a) as being unpatentable over Fukui in view of Hiroshi ISHIZUKA et al., JP 10-040958, machine translation (identified by the Office as "Hiroshi et al."). For convenience in discussing the 35 U.S.C. § 103(a) rejection in the present Action applicants will refer to JP 10-040958 in the following remarks as "Hiroshi".

In the first Action, Fukui was relied on by the Office as disclosing a rechargeable lithium battery which includes all of the limitations of the rechargeable lithium battery cited in claim 1 of the present application except for carbon dioxide dissolved in the electrolyte. Masatoshi was identified by the Office as teaching the use of dissolved carbon dioxide in a nonaqueous electrolyte solution in a rechargeable lithium battery for the purpose of suppressing swelling. The position of the Office was that it would

have been obvious in view of the teachings of Masatoshi to add carbon dioxide to the electrolyte of the battery of Fukui to suppress swelling.

In response to the rejections in the first Action applicants argued that the Office had not shown that the proposed combination of Masatoshi and Fukui would yield predictable results. More specifically, applicants argued that there is no disclosure or suggestion in the art that the swelling that occurs in the battery of Masatoshi would occur in the different battery of Fukui.

In the present Action, the Office is relying on Hiroshi as disclosing the dissolving of carbon dioxide in the electrolyte of a battery, which the Office characterizes as comprised of a negative active material compound including silicon, to improve charge and discharge characteristics. The position of the office is that it would have been obvious, in view of Hiroshi, to add silicon to the electrolyte of the battery of Fukui to provide superior charge and discharge characteristics.

The issue raised by the present rejection is essentially the same issue that raised by the rejections in the first Action, i.e., whether a person of ordinary skill in the art, in view of Hiroshi, would have been motivated to add carbon dioxide to the electrolyte of the battery of Fukui for any reason with the expectation of good

results.

Applicants respectfully submit that a person of ordinary skill in the art would not have been motivated, based on the combination of Fukui and Hiroshi, to add carbon dioxide to the electrolyte of a battery in which the negative electrode is made by sintering a layer of active material particles which is a mixture of silicon particles and/or silicon alloy particles as in the present invention.

In this regard, claim 1 has been amended to precisely recite that the active material particles containing silicon and/or a silicon alloy used to form the negative electrode in the battery of the present invention is a mixture of silicon particles and/or silicon alloy particles. This amendment is supported, inter alia, in paragraph [0023] of the specification of the present application. The claims have also been amended to precisely recite that the nonaqueous electrolyte contains carbon dioxide dissolved therein "in addition to carbon dioxide formed during fabrication of the battery." This recitation is supported in paragraph [0009] of the specification of the present application.

Hiroshi does not disclose a negative electrode made by sintering a layer of a mixture of silicon particles and/or silicon alloy particles or which is otherwise comprised of silicon

particles and/or silicon alloy particles. Hiroshi discloses that carbon dioxide is contained in a non-aqueous electrolyte of a non-aqueous secondary battery employing a non-crystal chalcogen compound and/or non-crystal oxide containing silicon as a negative electrode material (English Abstract). Therefore, the batteries of Fukui and Hiroshi use different negative electrode active materials. A person of ordinary skill in the art could not have reasonably predicted the results of adding dissolved carbon dioxide to the electrolyte of the different battery of Fukui and would not have been otherwise motivated to add dissolved carbon dioxide gas to the electrolyte solution of the rechargeable lithium battery of Fukui.

Further, an unexpected result of the present invention is the suppression of an increase in porosity of the negative electrode active material particles during charge and discharge (paragraph [0007] of the present specification). Hiroshi neither discloses nor suggests that an increase in porosity of negative electrode active material particles comprised of silicon particles and/or silicon alloy particles can be suppressed during charge and discharge by the addition of dissolved carbon dioxide to the electrolyte solution of a rechargeable lithium battery battery.

For the above reasons, the combination of Fukui and Hiroshi

does not support a case of *prima facie* obviousness of the claims of the present application and removal of the 35 U.S.C. § 103(a) ground of rejection is requested.

Double Patenting

Claims 1, 4-6, 8-10, 14-17, 20, 21, 26, 28 and 29 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting ("ODP") as being unpatentable over claims 1-7, 9-14, 23-25 of pending Application NO. 10/531,045.

A Terminal Disclaimer is filed herewith to overcome the ODP rejection.

The foregoing is believed to be a complete and proper response to the Office Action dated January 7, 2009.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension and any additional required fees may be charged to Deposit Account No. 111833.

Respectfully submitted,

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